Master Thesis

Gravity model of Construction. In case of Uzbekistan

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The Graduate School of Hansung University

Major in International Market Analysis

Dept. of International Trade and Economics

Khalimjanov Adkhamjon Rakhimjon Ugli

Master Thesis
Advisor Professor Jaewhak Roh

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– 시공의 중력 모형. 우즈베키스탄 경우 –

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Abstract

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This paper aims to analyze the construction trade between Uzbekistan and its main trade partners. In addition, a gravity model analysis trade between Uzbekistan and its trade partners over a period of 21 years, from 2000 to 2020 was conducted. The regression results corroborated the basic assumptions of the gravity model and designed which the GDP of Uzbekistan and GDP of trade partners of Uzbekistan has a positive influence on the construction trade volume. The population of partners also has a negative effect on international trade. And the transportation time(TT) has a main role in promoting the development of construction trade flows. Moreover, the TT of Uzbekistan has a negative effect on contruction trade flows. The trade development Uzbekistan is facing many problems such as long time logistic systems and transportation structure. The result of this paper provides for construction of Uzbekistan trade policy and future planning for the better trade with its partners. High transportation costs and low-quality logistic structure may have negative influences on the international trade. A better

transportation systems has more opportunity to captivate foreign direct investments and international trade ability.

【Keyword】 Bilateral trade, Transportation time, Exchange rate, Gravity model, Uzbekistan.

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Chapter 1   Introduction

1.1 Background

Countries can get commodities and services that would not otherwise be accessible locally through international trade, expanding their markets in the process. The expansion of the world economy was largely due to international trade. Global events have an impact on prices and have an impact on supply and demand in the global economy. Since the first civilizations started trading, there has been international trade, but in recent years it has grown in significance as a higher portion of GDP has been committed to exports and imports. International trade between nations is crucial for improving living conditions, creating jobs, and allowing customers to choose from a wider variety of items.

According to the World Bank, exports of goods and services as a percent of GDP had increased from 13 percent in 1970 to 30percent just before the financial crisis of 2008 and reached at again around 29.2 percent in 2020.

Table 1. Exports goods and services (% of GDP)
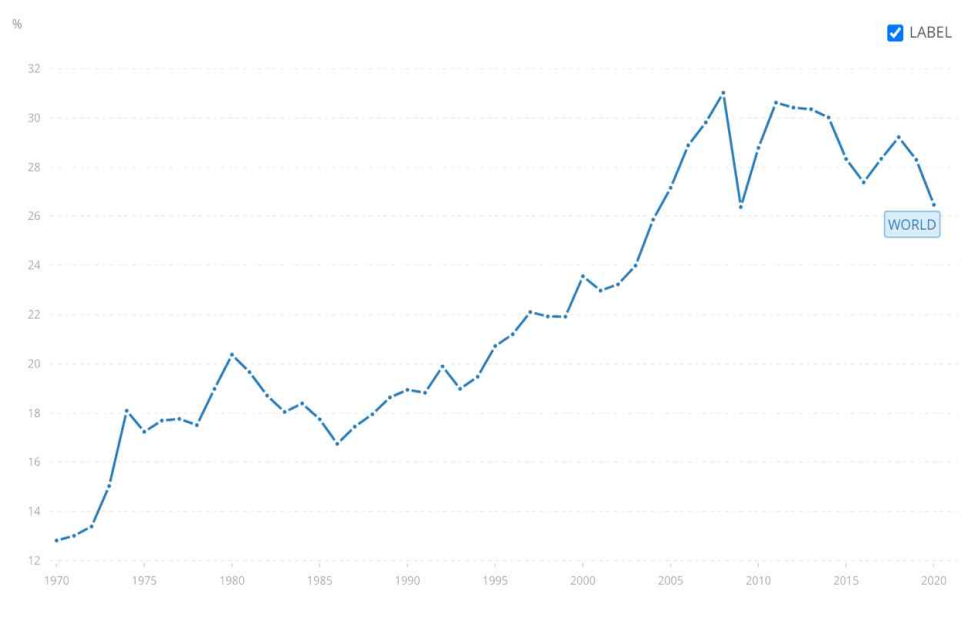
(Source: data.worldbank.org)

Table 2. GDP, GDP Per Capita and Annual % change of Uzbekistan
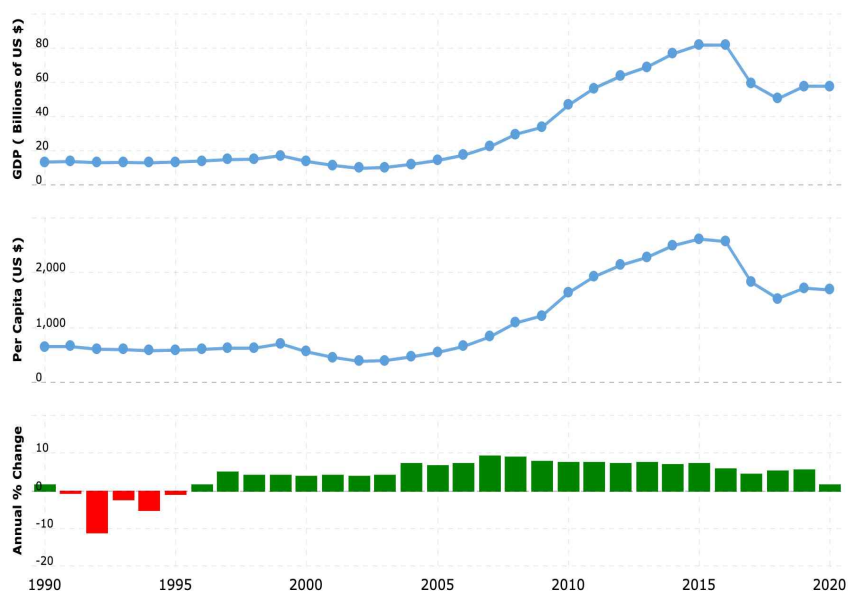
(Source: data.worldbank.org)

Uzbekistan is in the Central Asia, and it is surrounded by 5 countries such as Kazakhstan, Tajikistan, Afghanistan, Turkmenistan, and Kyrgyzstan. In addition, Uzbekistan is a landlock country and to go to the ocean it should pass 2 or 3 countries. Uzbekistan has been trying to strengthen its economy since its Independence Day 1991. Uzbekistan economy has been experienced a significant increase in country growth in several fields till in 1991. In addition, after independence government decided to improving investment conditions for foreign investors, developing the banking system, and freeing the agricultural sectors from government control. Uzbekistan is a rich in the field of agriculture and mining.

Although it was a difficult year, Uzbekistan still managed to grow its economy by 1.6 percent, and by 2020 it expects to have a GDP of 580.2 trillion Soum (57.7 billion US dollar). However, due to the national currency's 10.2 percent devaluation versus the dollar, GDP as expressed in US dollars remained essentially unchanged at 57.7 billion US dollar. After the government allowed the implementation of public and private construction projects throughout the pandemic, the construction industry continued to be a significant driver for the economy, and the number of active projects climbed by 9.1%. Production of consumer goods increased by 3-3.6 percent, as did agriculture and retail trade. The shipment of 100 tons of gold at the pinnacle of the global market price in 2020 helped Uzbekistan's foreign reserves, offsetting losses from a 78 percent reduction in natural gas exports. Additionally, Uzbekistan relied on foreign funding to sustain its economic support and anti-pandemic programs, which caused a 9.4 billion US dollar (or 38.5 percent) increase

in external debt. Consumer price inflation was 12.9 percent the GDP deflator was 11.9 percent relative to a baseline year of 2019 and both of which were lower than the previous two years.

Table .3. Key economic indicators of Uzbekistan

	2019	2020
Nominal GDP (billion USD)	57.9	57.7
Consumer price inflation (percent)	15.2	12.9
Foreign Direct Investment (billion USD)	2.28	1.7
Current account balance (billion USD)	-3.2	-3.1
Exports (billion USD)	17.9	15.1
Imports (billion USD)	24.3	21.2
External debt, private and public (billion USD)	24.4	33.8
Gross international reserves (billion USD)	29.2	34.9

(Source: State Statistics Committee, the Central Bank)

In 2020, Uzbekistan's foreign trade turnover decreased from 42.2 billion US dollar in 2019 to 36.3 billion US dollar , with 15.1 billion US dollar in exports and 21.2 billion US dollar in imports. It's interesting to note that Uzbekistan's trade deficit barely decreased by 0.3 billion US dollar. The machinery and transportation sectors accounted for 37.6% of the total amount of imports as the nation pursued its industrialization policy to acquire new capital equipment to improve its manufacturing sector and infrastructure. In 2020, gold accounted for 38.3 percent of exports, or 5.8 billion US dollar, from Uzbekistan. Trade between Uzbekistan and the United States fell from 603.9 US dollar million to 275.1 million US

dollar in 2020. The United States fell to 17th place in the list of trading partners because of the 318.9 million US dollar decrease in imports from the country. Major capital purchases, like Uzbekistan Airways' purchase of American-built aircraft for its fleet, can result in considerable variations in bilateral trade from year to year due to the comparatively low volume of trade between the United States and Uzbekistan.

The Constitution of Uzbekistan establishes a presidential system with a representative government and a division of powers. The executive branch and the office of the president hold a disproportionate amount of power. The following presidential election in Uzbekistan will take place on October 24, 2021. President Mirziyoyev pursued a reform agenda after winning the 2016 election, transforming Uzbekistan from a closed, isolationist nation to one ready to work with its neighbors as well as regional and international powers. In 2017, the government began to carry out the reforms needed to move toward a more open, competitive, and market-based economy.

Although Uzbekistan has signed bilateral agreements with 54 nations to prevent double taxation, the U.S. government still deems the 1973 U.S.-USSR tax treaty to be in effect regarding Uzbekistan. Additionally, Uzbekistan has agreements with 47 nations that grant it most-favored-nation status. Agreements between the United States and Uzbekistan on commercial relations, including most favored nation status, and on promoting and mutually protecting investment were finished in 1994, but the United States never ratified them. Uzbekistan signed up for the CIS Free Trade Zone Agreement in 2014. Uzbekistan became an observer member of the Eurasian Economic Union (EAEU) on December

11, 2020. The General System of Preferences Plus (GSP+) trade agreement, which eliminated tariffs on some goods, welcomed Uzbekistan as the eighth beneficiary on April 9, 2021. The General System of Preferences Plus (GSP+) trade agreement, which removed tariffs on 2,200 product lines, was accepted by the European Union on April 9, 2021. In exchange, Uzbekistan agreed to implement 27 ratified core international conventions on human and labor rights as well as environmental and climate protection, and better governance. Additionally, Uzbekistan is attempting to join the World Trade Organization (WTO).

Uzbekistan has the foundation needed to become a regional economic powerhouse, with an estimated population of 34 million: a dynamic, literate, and entrepreneurial population – the largest in Central Asia, relatively good infrastructure, and the region's largest potential consumer market. The cotton industry in Uzbekistan, as well as its abundant natural resources such as gold and natural gas, provide appealing opportunities for investors. The government's declared economic policy prioritizes attracting private investments by improving Uzbekistan's business climate, privatization, and foreign trade liberalization. According to multilateral development banks (MDBs), Uzbekistan's GDP will grow by 5-6 percent in 2021-2022. GDP increased by 6.2 percent in the first half of 2021, according to official figures. Fitch rates Uzbekistan's outlook as stable, while S&P upgraded it from negative to stable and Moody's from stable to positive. Jamshid Kuchkarov, Deputy Prime Minister and Minister of Economic Development and Poverty Reduction, declared in May 2021 that the government had set a goal of increasing per capita GDP from 1,700 US dollar to 2,500 US dollar by 2025, and 4,200 US

dollar by 2030.

GDP and employment of Uzbekistan. GDP of Uzbekistan was 60,490 billion US dollar and GDP per capita was 1,832 US dollar in 2019. In addition to this, GDP growth were 5.4 percent in 2018, 5.6 percent in 2019, 1.5 percent in 2020 and 6.6 percent in 2021. Moreover, according to national statistics, the total number of employed increased from 8.5 million in 1995 to 13.5 million in 2011 and in 2019 the number of employed rose to 15.5 million. 60.9 percent of employment was working in the service industry and 25.9 percent of them were working in the agriculture sector and 13.2 percent of labor was working in the industry sector in the 2012.

In addition to this, Uzbekistan trade balance was positive from 2000 to 2013 and was negative between 2017 and 2019 years. Uzbekistan exported 11.48 billion US dollar goods in 2017. Main export products of Uzbekistan were energy products, gold, cotton, mineral fertilizers, textiles, foodstuffs, machinery, and automobile. In addition to this, Switzerland with 38.7 percent, China with 15.5 percent, Russia with 10.7 percent, Turkey with 8.6 percent, Kazakhstan with 7.7 percent and Afghanistan with 4.7 percent are main top export partners of Uzbekistan respectively. On the other hand, Uzbekistan imported 11.52 billion US dollar goods in 2017. Main export products of Uzbekistan were machinery and equipment, foodstuffs, chemicals, ferrous and non-ferrous metals. Furthermore, China with 23.7 percent, Russia with 22.5 percent, Kazakhstan with 10.7 percent, Korea with 9.8 percent, Turkey with 5.8

percent and Germany with 5.6 percent are the main top import partners of Uzbekistan.

Economic and Trade evolution from 1991 to 2021

After independence 1991, economy of Uzbekistan saw some difficult situations during 1991–2014. In this period, Uzbekistan government changed its currency such as it left the Soviet Union currency and created its national currency in July 1994. After changed its currency the inflation rate reached its peak 1,239 percent in 1994 and declined to 371 percent in 1995. We can see from the graph inflation rate was 91 percent in the 1991 and it rose to 1,079 percent in 1993. After this increase Uzbekistan government decided to change its currency.

Table 4. Inflation rate of Uzbekistan in 1991–1995 (%)

Source: World Bank data base: https://data.worldbank.org/
indicator/NY.GDP.DEFL.KD.ZG?Locations =UZ.
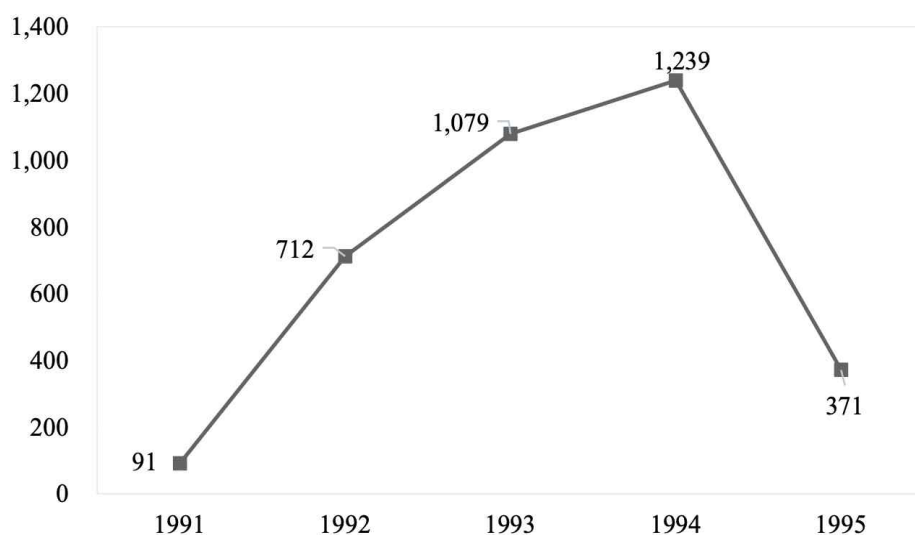
GDP of Uzbekistan declined until 1995 after independent but from 1996 its GDP has risen since 1996. Cotton and gold export helped to Uzbekistan economy between 1991 and 1996 and in 1996 and 1997 cotton and gold prices declined but government has maintained its GDP growth rate 1.7 percent and 5.2 percent respectively. According to the graph, GDP growth of Uzbekistan was around 4 percent between 1998 and 2003 and it increased dramatically to 7.4 percent in 2004. In addition, Uzbekistan government has succeeded to GDP growth increase by 9 percent and 8.1 percent in world economic crisis period in 2008-2009 period. After world crisis its economy growth was around 8 percent till 2016.

Table 5. GDP growth in Uzbekistan in 1991-2016 (billions USD)
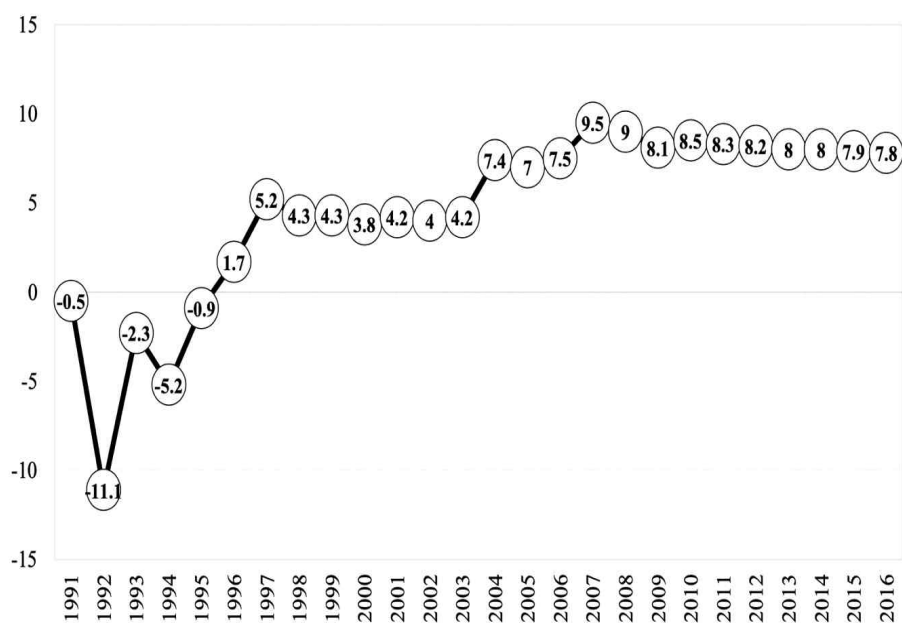
Source: The State Committee of the Republic of Uzbekistan

Uzbekistan government did not open its economy for the foreign investment so that foreign direct investment was low between 1991-2002. There were small number of investments and joint venture at that period such as Daewoo, Mercedes Benz, British American Tobacco and Newmont Industries and Oxus.

Table 6. FDI inflows in Uzbekistan in 1991-2016 (billions USD)

Source: World Bank data base:
https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?end=2016&locations=UZ&start=1991.

Uzbekistan government opened its doors for foreign investors from 2003 and after that inflow of the FDI increased from 0.08 billion USD in 2003 to 1.6 billion US dollar in 2010 and 2011.

Export and import volumes of Uzbekistan increased significantly from 1991 to 2001. According to the export and import graph the volume of export rose dramatically from 3.3 billion US dollar in 2000 to 11.5 billion US dollar in 2008. On the other hand, the volume of import fluctuated between 3 billion USD in 2000 and 3.8 billion US dollar in 2004 and increased significantly until 2008. Moreover, In world crisis period, the volume of export increased by 6 billion US dollar between

2007 and 2011 years and the volume of import rose from 6.7 billion US dollar in 2007 to 11.3 billion US dollar in 2013. In addition, both the volume of export and import increased about 9 billion US dollar in 2000- 2016 period. The volume of imports was surpluses by 0.4 billion US dollar and 0.04 billion US dollar the volume of exports only two years in 2014 and 2016 respectively.

Table 7. The volume of exports and imports of goods and services in 2000-2016 (billion US dollar)

The gravity model has been many used in international trade research. This paper also aims to analyze the construction trade relationship between Uzbekistan and eleven partner countries with the help of the gravity model. In this research paper the "Gravity- model" is used to

find answer the research question: "What kind of factors may affect Uzbekistan's construction trade flows with China, Kazakhstan, Kyrgyzstan, South Korea, Japan, Germany, Turkey, Ukraine, Tajikistan, Belarus and Russia?" after finding the regression's result one can obviously answer the questions below too: Do the two countries have a strong effect towards the construction trade between both parties, when the distance has an impact on construction trade flows?

– Finding the impact of population size on construction trade?

–How Uzbekistan's total GDP affects construction trade flows?

– Is there any influence of transportation time on the bilateral trade of Uzbekistan?

– how exchange rate effects to two parties trade volume?

– Is CIS (Commonwealth of Independent States) membership influence on the bilateral trade of Uzbekistan.

This research paper plans to find previous results and some other factors too. The regression of this research paper is run on the gravity model method, using "R Studio 4.2.0" software for multiple linear regressions.

The data find out in this research paper is going to be panel data, and the time period includes 21 years from 2000 to 2020. In addition to this, paper is expected to use data resources below: UN Comrade, Word Bank, Google Map, Official website of WTO, WITS statistics, official statistics of Uzbekistan, International Monetary Fund data, etc, in during the process of writing.

1.2. Structure

This paper includes five chapters. they are, research background and research purposes are explained in the first chapter. In addition, The second chapter includes the international trade relations between Uzbekistan and trade partners. Moreover it is the third chapter is a literature review on the gravity model in the third chapter. Furthermore, The fourth chapter includes s methodology and results from regression analysis. Lastly, The fifth chapter is the conclusion part that outline the result and gives some advises about promoting contruction trade relations.

Chapter 2   International trade relations between Uzbekistan and Trade partners.

2.1 Trade volume between Uzbekistan and South Korea

South Korea is situated in East Asia on the southern half of the Korean Peninsula and its capital city is Seoul. Distance from Seoul to Tashkent is 5398.99 km. One of Uzbekistan's biggest investment partners nowadays is South Korea. Over the course of the partnership, Korean investments in Uzbekistan's economy totaled more over $7 billion. There are currently more than 900 Korean-owned businesses in Uzbekistan, of which around 550 were founded entirely using Korean capital. These businesses focus mostly on commerce, small-scale mining, chemicals, food, mechanical engineering, metallurgy, housing and community services, tourism, and the services industry. In addition, there are several Korean leading companies in Uzbekistan such as Kogas, KNOC, Posco International, Korean Air, Shindong Enercom, Haintex, LG, Hanshin Engineering & Construction, Bomi E&C, Myung Sung Placon, Shindong Resources and others also have been successfully operating for an extended period.

Uzbekistan imported 1.85 billion US dollar from South Korea in 2020. The main products that Uzbekistan imported from South Korea are Vehicle Parts (761 million US dollar), Cars(147 million US dollar) and Prefabricated Buildings (104 million US dollar). During the last 25 years the imports of Uzbekistan from South Korea have increased at a distinguished rate of 8.44 percent, between 244 million US dollar in 1995

and 1.85 billion US dollar in 2020. On the other hand, Uzbekistan exported 30.8 million US dollar to South Korea in 2020. Recovered Paper Pulp (8.55 million Us dollar), Pitted Fruits (5.77 million US dollar) and Cars (3.25 million US dollar) were the main products which Uzbekistan exported to South Korea. Moreover, the exports of Uzbekistan to South Korea have fallen at an significant rate of 5.41 percent during last 25 years from 123 million US dollar in 1995 to 30.8 million US dollar in 2020.

In April 2022 Uzbekistan exported 1.65 million US dollar and imported 183 million US dollar to South Korea, resulting in a negative trade balance of −181 million US dollar. From April 2021 and April 2022, the exports of Uzbekistan decreased by −782 thousand US dollar (−32.2 percent) from 2.43 million US dollar to 1.65 million US dollar, meanwhile imports have risen by 26.8 million US dollar (17.2 percent) from 156 million US dollar to 183 million US dollar.

Table 8. Uzbekistan's imports from South Korea
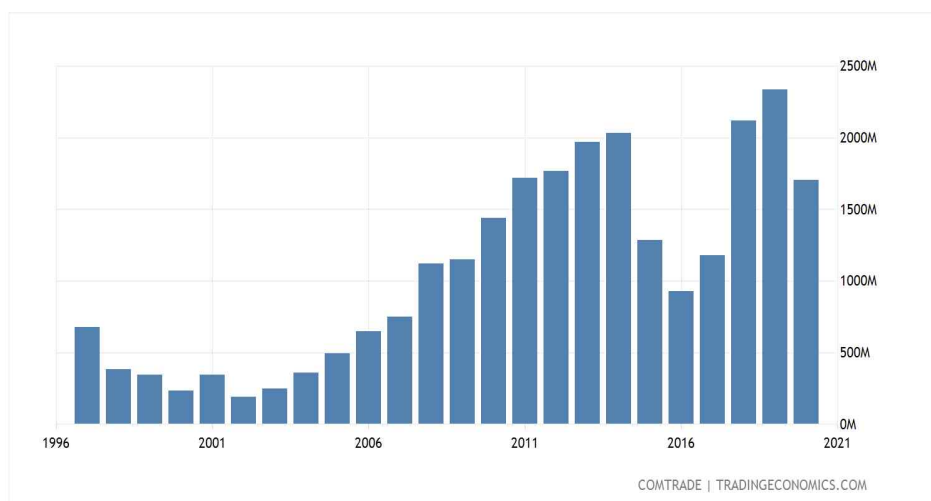
(Source: Trading Economics)

2.2 Trade volume between Uzbekistan and Japan

Japan is situated in northwest Pacific Ocean and Japan is bordered on the west by the Sea of Japan meanwhile extending from the Sea of Okhotsk in the north toward the East China Sea, Philippine Sea and in the south with Taiwan. It is an island country in East Asia and its capital is Tokyo. In addition, distance from Tokyo to Tashkent is 6214.94 km.

It was announced that the economic partnership between Uzbekistan and Japan has been steadily developing in recent years, thanks to regular bilateral contacts at the level of the two states' leadership, as well as ministries and departments.

According to the results of the first three months of this year, the volume of mutual trade exceeded the same indicator from the previous year twice. Chemical products, services, nonferrous metals, textile products, food products, vegetable juices and extracts dominate Uzbekistan's exports to Japan, while vehicles, plastic products, machinery, and equipment are the most frequently imported. Increased exports of Uzbek textiles, fruits and vegetables, chemicals, and alloys to Japan are being actively pursued.

It was announced that the economic partnership between Uzbekistan and Japan has been steadily developing in recent years, thanks to regular bilateral contacts at the level of the two states' leadership, as well as ministries and departments.

Significant progress has also been made in the investment sphere: currently, 46 enterprises with Japanese participation operate in Uzbekistan,

30 of which have 100 percent Japanese capital. The oil and gas, petrochemical, machine-building, and chemical industries, as well as the production of equipment for energy facilities, transportation and logistics services, trade operations, education, and tourism, are all represented by accredited representative offices of 15 large Japanese companies. It was announced that the economic partnership between Uzbekistan and Japan has been steadily developing in recent years, thanks to regular bilateral contacts at the level of the two states' leadership, as well as ministries and departments.

The parties reviewed the status of 22 projects worth 4.3 billion US dollar that were signed following the President of the Republic of Uzbekistan's visit to Japan in 2019. The Uzbek side welcomed JICA's initiative to apply in Uzbekistan a new instrument for financing the private sector without the need for state guarantees, with a focus on financing the energy sector and supporting small and medium-sized businesses.

Japan imported 6.39 million US dollar from Uzbekistan in 2020 and the main products that Japan imported from Uzbekistan are Potassic Fertilizers (1.49 million US dollar), Non-Retail Pure Cotton Yarn (456 thousand US dollar), and Molybdenum (445 thousand Us dollar). The imports of Japan from Uzbekistan have fallen at an annualized rate of 10.4 percent from 99.9 million US dollar in 1995 to 6.39 million US dollar in 2020 in during the last 25 years. On the other hand, Uzbekistan imported 187 million US dollar in 2020 and Delivery Trucks (75.4 million US dollar), Vehicle Parts (20.2 million US dollar) and Large Construction Vehicles (18.9 million US dollar) were the main products that Uzbekistan imported from Japan. In addition, during last 25 years

the imports of Uzbekistan from Japan have risen at a significant rate of 3.42 percent from 80.8 million US dollar in 1995 to 187 million US dollar in 2020.

Table 9. Uzbekistan's imports from Japan
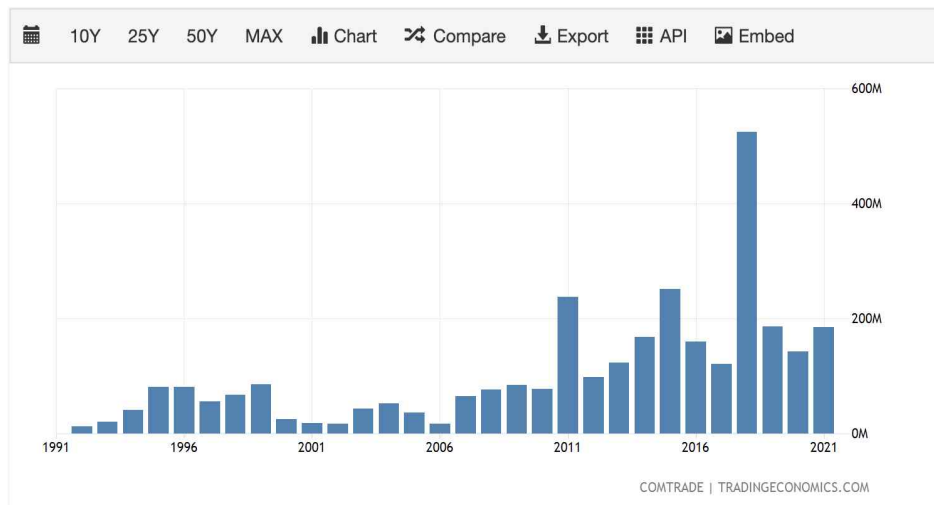
(Source: Trading Economics)

2.3 Trade volume between Uzbekistan and Germany

Germany is a country in Western Europe with a landscape that includes forests, rivers, mountain ranges, and North Sea beaches. Germany is situated in the north with Denmark, in the east with Poland and the Czech Republic, in the south with Austria and Switzerland, and addition, in the west with Belgium, France, Luxembourg and the Netherlands. Germany's capital and largest city is Berlin, and its financial center is Frankfurt; the Ruhr is the largest urban area. And distance from Berlin to Tashkent is 4198.42km. Germany is becoming a more important

trading partner for Uzbekistan. The volume of bilateral trade has recently increased rapidly, reaching approximately 630 million euros in 2020. MAN, Knauf, Gühring, and Claas are among the major German investors in Uzbekistan.

In 2019 and 2020, Germany and Uzbekistan's development cooperation was significantly expanded. It will be increased further beginning in 2021, with the opening of the KfW Office. The focus has been on health care and long-term economic development, particularly in the Aral Sea region of the autonomous republic of Karakalpakstan, in collaboration with Afghanistan. Uzbekistan is also involved in regional projects that aim to strengthen regional cooperation in the areas of economy, vocational training, microfinance, and the environment, as well as to prevent crises. Furthermore, the country takes part in cross-border regional activities, such as projects promoting the rule of law in Central Asia. Furthermore, Germany is funding a project in Central Asia, including Uzbekistan, to combat violent extremism. This project assists Uzbek authorities and civil society organizations working on extremism reforms.

On 28 January 2020, a new German initiative focusing on the impact of climate change on regional security in Central Asia was launched at the high-level conference "Green Central Asia – Enhancing environment, climate, and water resilience" held in Berlin. The goal is to strengthen regional cooperation (among the five Central Asian countries and Afghanistan), improve information exchange, and connect with academia and civil society.

In general, there has been a positive dynamic of growth in trade turnover between Uzbekistan and Germany over the last three years. So, between

2016 and 2019, trade between the two countries increased by 87 percent, from 529.1 to 989.8 million dollars. At the same time, exports increased by 69% while imports increased by 84%.

Due to the coronavirus pandemic, trade fell 16.2 percent to $ 829.0 million in 2020. At the same time, exports increased by 13.3% from 62.2 to 70.5 million dollars, while imports fell by 18.2% from 927.5 to 758.5 million dollars. In 2020, the volume of utilized German investments increased by 25% to exceed $ 710 million as part of the implementation of approximately 110 investment projects.

Germany's Federal Ministry for Economic Cooperation and Development has developed a new "Strategy 2030" that reduces the number of partner countries for bilateral cooperation. At the same time, only Uzbekistan was included on the short list of Central Asian countries, allowing bilateral cooperation on joint project implementation to continue

Uzbekistan imported 704 million US dollar from Germany in 2020. Packaged Medicaments (58.3 Million US dollar), Glass Working Machines (39.3 Million US dollar), and Rubberworking Machinery (38.2 Million US dollar) are the top three German exports to Uzbekistan. Germany's exports to Uzbekistan have increased at an annualized rate of 2.78 percent over the last 25 years, from 355 million US dollar in 1995 to 704 million US dollar in 2020. In November 2021, Germany exported 57.7 million Euro and imported 6.43 million Euro from Uzbekistan, resulting in a 51.3 million Euro positive trade balance. Between November 2020 and November 2021, Germany's exports fell by −1.46 million Euro (−2.47%), from 59.1 million Euro to 57.7 million Euro, while imports increased by 3.65 million Euro (131%), from 2.78 million

Euro to 6.43 million Euro. On the other hand, Uzbekistan exported 33.6 million US dollar to Germany in 2020. Uzbekistan's main exports to Germany were molybdenum (4.09 million US dollar), perfume plants (2.45 million US dollar), and dried vegetables (1.91 million US dollar). Uzbekistan's exports to Germany have decreased at a distinguished rate of 6.48 percent over the last 25 years, from 180 million US dollar in 1995 to 33.6 million US dollar in 2020.

In November 2021, the top imports of Uzbekistan from Germany were Pharmaceutical products (5.38 million Euro), Machinery for textile, apparel, leather production (5.25 million Euro), Other articles of iron, iron sheet,... (4.45 million Euro), Machinery for electricity production, distribution (4.05 million Euro), and Medical, surgical equipment, orthopaedic apparatus (3.75 million Euro). Furthermore, in November 2021 the top exports of Uzbekistan to Germany were Other base metals (2.52 million Euro), Lead and lead alloys, incl. waste, (720 thousand Euro), Yarns of cotton (561 thousand Euro), Spices (348 thousand Euro), and Other raw material for chemical products (312 thousand Euro).

Table 10. Uzbekistan's trade from Germany
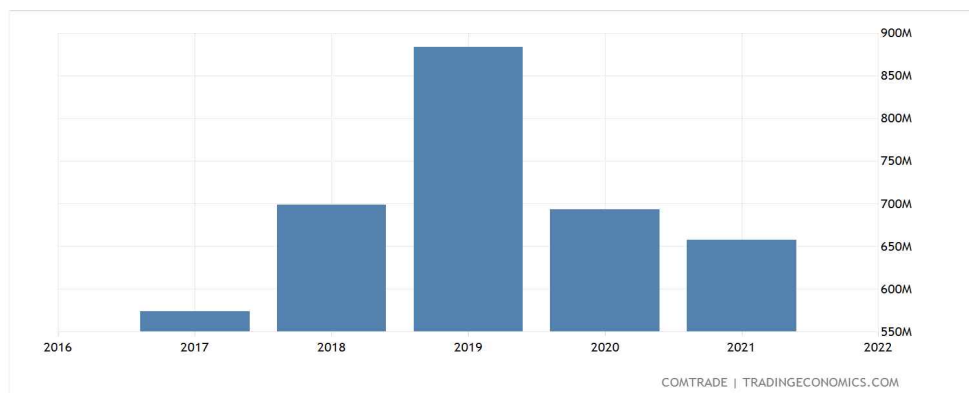
(Source: Trading Economics)

2.4 Trade volume between Uzbekistan and Turkey.

The Turkish-Uzbek Business Council was established in 1993, and over 90 bilateral agreements and protocols in various fields were signed between 1992 and 2019 to form the legal basis of relations. Turkish investors have made significant investments in Uzbekistan's infrastructure, energy, and communication sectors. Relations between Turkey and Uzbekistan have progressed since the establishment of diplomatic ties in 1992, with agreements, high-level visits, trade, and tourism—but not to the desired level.

Because of the two countries' political problems, which began in 1994 and worsened in 1999 and 2005, most of the steps taken to promote economic relations could not be fully implemented.

Turkey has been an important cultural pole for Uzbekistan at times. In the 1990s, for example, 2,000 Uzbek students attended Turkish universities. As a result of this trend, Turkey has become the most popular country for Uzbeks to study abroad. However, in 1994, the Uzbek government ordered the return of 1,600 of the 2,000 Uzbek students studying in Turkey. After more than two decades of rocky relations, relations between the two countries have recently improved.

Turkey appears to have relatively strong trade relations with Uzbekistan. Although diplomatic relations have since deteriorated, prior to the implementation of restrictive measures affecting Turkish businesses in the country in 2010, Turkey was Uzbekistan's third largest export destination, ranking fourth in 2017. Even though Uzbekistan was then ranked 45th in terms of exports and imports among Turkey's global trade partners, both

increased in 2017. Turkish exports to Uzbekistan totaled 680 million US dollar in 2017, up from 147 million US dollar in 2016. Imports from Uzbekistan totaled 823 million US dollar in 2017, an increase of 114 million US dollar from the previous year, and trade volume between Uzbekistan and Turkey reached 1.5 billion US dollar in 2017. Turkey's direct investments in Uzbekistan now exceed 1 billion US dollar, and the number of completed projects has risen to 88, worth a total of 2 billion US dollar. There are currently 500 Turkish firms and companies operating in Uzbekistan, with 100 of them serving as representation offices in industries such as construction, textiles, food, hotel service, commitment, building materials, medication, and plastic. Except for Kazakhstan, all Central Asian countries have an excess of employable people, so Turkey is seen as a viable alternative to the traditional routes of labor migration to Russia. Approximately 300,000 Uzbek migrants are currently working in Turkey, the majority of whom are illegal migrants without documents for temporary residence and work.

Foreign trade is vital to both the Turkish and Uzbek economies. According to World Bank data, the share of exports in GDP in Turkey in 1992, 2000, 2010, and 2017 was 14.39 percent, 19.45 percent, 20.45 percent, and 24.80 percent, respectively. Uzbekistan's export share of GDP is significantly higher than Turkey's. In Uzbekistan, the export/GDP ratio was 24.66 percent in 2000, 31.27 percent in 2010, and 29.80 percent in 2017.

The data suggests that exports are important in terms of national income and economic growth, particularly in Uzbekistan. Turkey established trade relations with Uzbekistan in 1992, and Turkey's trade balance was

generally positive during the first years of bilateral trade. After 2003, there was an imbalance in trade between these countries that favored Uzbekistan. From 1992 to 2017, bilateral trade increased dramatically. Turkey's exports to Uzbekistan increased by 1,148 percent in 2017, while imports from Uzbekistan increased by 3,817 percent.

The economic crises of 1994, 2000, and 2001 had a significant impact on Turkey's foreign trade, as shown in Table 14. Turkey's exports to Uzbekistan fell dramatically during this period. In terms of import dynamics, Turkey's imports from Uzbekistan were more volatile during the study period. Bilateral trade between Turkey and Uzbekistan should be expanded.

Uzbekistan's share of total Turkish exports is 0.30 percent, 0.25 percent, and 0.43 percent in 2000, 2010, and 2017, respectively, while Uzbekistan's share of total Turkish imports is 0.16 percent, 0.46 percent, and 0.35 percent.

In terms of the sectoral share of Turkish imports from Uzbekistan in 1992, Turkish imports were primarily labor-intensive goods. During the period 1992-2010, the share of raw materials gradually increased. In addition, the share of capital-intensive goods has increased dramatically between 2010 and 2017. In 2017, the share of labor-intensive goods fell to its lowest level.

Uzbekistan exported 1.01 billion US dollar to Turkey in 2020. Uzbekistan's main exports to Turkey are refined copper (418 million US dollar), non-retail pure cotton yarn (195 million US dollar), and raw zinc (117 million US dollar). Uzbekistan's exports to Turkey have increased at an annualized rate of 12.1 percent over the last 25 years,

from 57.5 million US dollar in 1995 to 1.01 billion US dollar in 2020.

Uzbekistan imported 1.18 billion US dollar from Turkey in 2020.Uzbekistan's main imports from Turkey were packaged medicines (56.5 million US dollar), liquid dispersing machines (39.1 million US dollar), and toilet paper (39 million US dollar). Turkey's exports to Uzbekistan have increased at an annualized rate of 8.95 percent over the last 25 years, from 138 million US dollar in 1995 to 1.18 billion US dollar in 2020.

Table 11. Uzbekistan's trade volume with Turkey
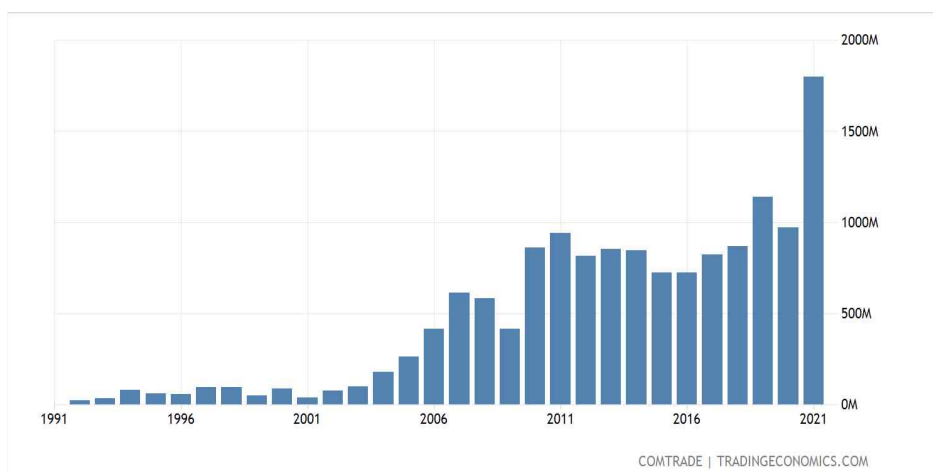
(Source: Trading Economics)

2.5 Trade volume between Uzbekistan and China.

China views Uzbekistan as a nation with a sizable consumer market, a work population that is inexpensive, a stable political environment, and significant governmental authority. It is also intrigued by Uzbekistan's welcoming business climate and its enormous potential for infrastructure development projects. China made up 17.7 percent of Uzbekistan's

international trade turnover in 2021. This is just a little bit more than Russia's part. China will hold 3 billion US dollar, or 20%, of Uzbekistan's total foreign debt, by the year 2020. By the end of 2021, Chinese investment in the Uzbek economy had reached 9 billion US dollar. However, Chinese sources claim that as of the end of 2019, China has made a total of 3.2 billion US dollar in direct investments in Uzbekistan. Chinese investments in Uzbekistan are diverse, ranging from agriculture and logistics to oil and gas. For instance, the Chinese firm Jinsheng Group made an investment in an operational textile facility in Uzbekistan in 2017. 95 percent of the cotton yarn produced here, which is 22,000 metric tons annually, is exported, with China accounting for half of those exports. Due to inexpensive raw ceramic materials, low energy costs, and a sizable local consumer market, Foshan-based Xin Zhong Yuan Ceramics started a 150 million US dollar ceramics production plant in Uzbekistan in 2017. The governments of Uzbekistan and China reached a virtual agreement in March 2021 to attract significant Chinese corporations to Uzbekistan, and the Uzbek government compiled 40 project ideas for potential Chinese investors to consider. The Oltin Yo'l gas-to-liquid processing plant is the recipient of Uzbekneftegaz's 1.2 billion US dollar largest loan from China to Uzbekistan, which was signed in 2017. Exports from China to Uzbekistan increased dramatically from 104 million US dollar in 2002 to 5.2 billion US dollar in 2021, according to data from the International Trade Center. The country's imports from Uzbekistan surged throughout that time from 27 million US dollar to nearly 2 billion US dollar. While China continues to diversify its exports to Uzbekistan and includes a

range of industrial goods, Uzbekistan mostly exports cotton and mineral fuels, particularly natural gas. Mineral fuels made up 38 percent of Uzbekistan's total exports in 2021, compared to cotton's index of 33 percent. Due to a lack of export diversification and potential price changes for exported goods, Uzbekistan is at risk. It is significant to note that since 2016, with the election of Shavkat Mirziyoyev as president and the implementation of the new economic strategy.

Table 12. Uzbekistan's trade with China, million $
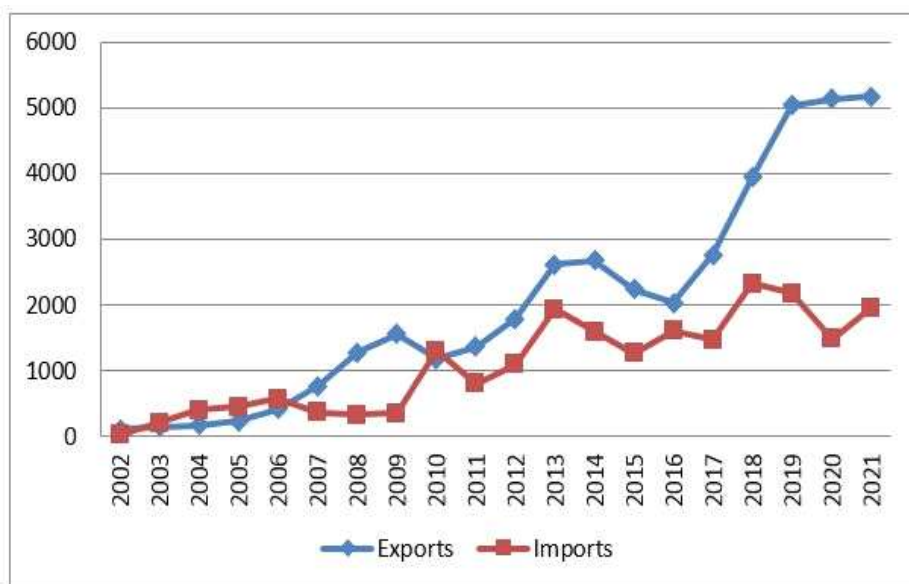
Source: The Author's compilation based on the ITC (2022) data.

China has increased its exports to Uzbekistan. Uzbekistan seeks to diversify its infrastructure network and enter new export markets by working with China. Uzbekistan recently revealed its "Development Strategy of New Uzbekistan for 2022-2026" during a conference of the Shanghai Cooperation Organization in Beijing, demonstrating the country's expanding economic ties with China. The China-Kyrgyzstan-Uzbekistan railway, which gives Uzbekistan access to South Asian markets, is one of

the country's most significant projects. It is important to note that Uzbekistan and China inked a five-year deal on cooperation in trade and investment at the beginning of February.

The Belt and Road Initiative (BRI) continues to benefit Uzbekistan's transport connectivity by providing funding and assistance for the construction of a shared transnational transportation network. Producers from Uzbekistan can interact with those in China, Iran, West Asia and India, Europe, and Turkey by taking part in the program. Uzbek shipment time is expected to decrease by approximately 15% because of BRI enhancements to the country's transportation infrastructure, the greatest decrease among the BRI nations. Falling shipment times will thus increase Uzbekistan's exports by 13 to 23%.The combined impact of finished BRI transportation projects and changes that cut border-crossing waits in half is what causes the larger expected increase. Human rights abuses in Xinjiang, Chinese workers, technology brought on by Chinese investments, and worries about falling into a debt trap are some of the causes of this approach. Therefore, Uzbekistan's historical position of international neutrality and mistrust of any extra regional players is strongly at odds with economic dependency on China. The excessive reliance on Chinese investments by Uzbekistan should be carefully evaluated. Concessional loans for infrastructure and technical assistance projects, which require that at least 50% of the goods, services, and technology purchased under the contract come from China, are among these hazards.

However, despite China's advancements in economic integration with Central Asia, Central Asians still view China with suspicion. Public

opinion toward China among those surveyed in Kazakhstan, Kyrgyzstan, and Uzbekistan showed a steady drop, according to the Central Asia Barometer Survey, a biennial large-scale research project that gauges social, economic, and political atmospheres in the region. Respondents' opinions of China in Kazakhstan and Uzbekistan have been more unfavorable between 2017 and 2021.

Since Shavkat Mirziyoyev took office, Uzbekistan has made substantial economic growth. Foreign direct investments totaled 25 billion US dollar last year, with nearly 2.5 million new jobs and 59, 000 investment projects launched over the previous six years. The nation set high objectives for economic change. The government of Uzbekistan wants to quadruple exports to 30 billion US dollar and increase GDP to 100 billion US dollar, with the private sector accounting for 80% of output. Uzbekistan hopes to join the World Trade Organization by 2030 or early and reach an upper middle-income status for its GDP per person. Uzbekistan requires foreign direct investments in its infrastructure and important industrial sectors to accomplish these objectives. In this regard, collaboration with China may be crucial to the diversification of the Uzbek economy. Even if Uzbekistan and China's present bilateral ties are optimistic, there are concerns to be aware of. Overdependence on China's investments, loans, and help can lead to skewed decisions given the nature of bilateral trade. To drastically minimize risks and expand economic opportunities, the Uzbek government must intensify competition among foreign powers in terms of investments and the execution of joint projects.

2.6 Trade volume between Uzbekistan and Russia

Despite numerous assertions to the contrary, Russia continues to be a significant trading partner in the region. Additionally, its bilateral ties with Uzbekistan strengthened. Vladimir Putin visited Uzbekistan in 2018, and while there, the two sides struck business agreements totaling 27 billion US dollar, which will have an impact on the trade patterns and industrialization of the nation. Additionally, Uzbekistan has joined the Eurasian Economic Union (EAEU) as an observer state, enabling it to take part in open meetings and receive non-confidential papers. Benefits and expenses are both promised by the EAEU. If the former is mostly tied to improved conditions for migrants from Uzbekistan and new export opportunities, the latter is primarily linked to the country's trade policy's independence and fierce rivalry from Russian enterprises. Therefore, these elements will have an impact on future bilateral commerce between the nations. Therefore, it is crucial to examine historical dynamics of bilateral trade flows between Russia and Uzbekistan to comprehend the prospects of trade.

The findings indicate that trade between the two nations has increased significantly during the past 20 years. From less than 1 billion US dollar in 2001 to more than 5 billion US dollar in 2019, trade volume rose. It is significant to note that Uzbekistan exported more in 2001 than it imported. Its imports were 409 million US dollar while it gave Russia commodities worth 584 million US dollar. The bilateral trade flows were negatively impacted by the world financial crisis. Except for the time when the trade shocks caused by the financial crisis occurred, export and

import deficits were negligible up until 2011. But starting in 2011, Uzbekistan's exports to Russia began to fall, while Russian trade data kept rising. These modifications happened following the formation of the Customs Union between Belarus, Kazakhstan, and Russia, and new accounting practices may be to blame. Trade data reveals that although Uzbekistan's exports to Russia started to decline, its supplies to Kazakhstan dramatically surged. For instance, Russia bought vegetables and fruits from Uzbekistan worth 139.3 million US dollar and 288.6 million US dollar, respectively, in 2010. The amount of imports for the same products fell to 26.2 million US dollar and 104.1 million US dollar in 2012, respectively, and continued to fall in the years that followed. Fruit imports to Russia fell to a low of 4 million US dollar in 2014. At the same time, Kazakhstan imported vegetables and fruits worth 42.2 million US dollar and 30.6 million US dollar from Uzbekistan in 2010. Its imports began to rapidly increase in the years that followed. The associated imports totaled 65 million US dollar and 198.6 million US dollar in 2012. Kazakhstan spent US dollar 284.2 million on fruit purchases in 2014. It is significant to note that Kazakhstan imported vegetables and fruits worth $0.9 million and $1.3 million, respectively, in 2009. As a result, fruit exports from Uzbekistan to Kazakhstan surged by 218.6 times in 2014. The validity of the data is questioned by this increase in exports. Trade flow statistics show significant differences as well. For example, according to Russian sources, the country imported 1.2 billion US dollar in Uzbekistan products, while Uzbekistan sources report that the country's exports to Russia exceeded 2 billion US dollar, revealing a 800 million US dollar difference. The same gaps have existed

in previous years. In 2018, the difference between two data sources was nearly 600 million US dollar. As a result, statistics have become inaccurate since the creation of the Customs Union, necessitating additional research that is limited by data scarcity. It should be noted that data from Uzbekistan sources are only available since 2017, when the country began its open economic policy.

Table 13. Uzbekistan's exports to and imports from Russia, million $
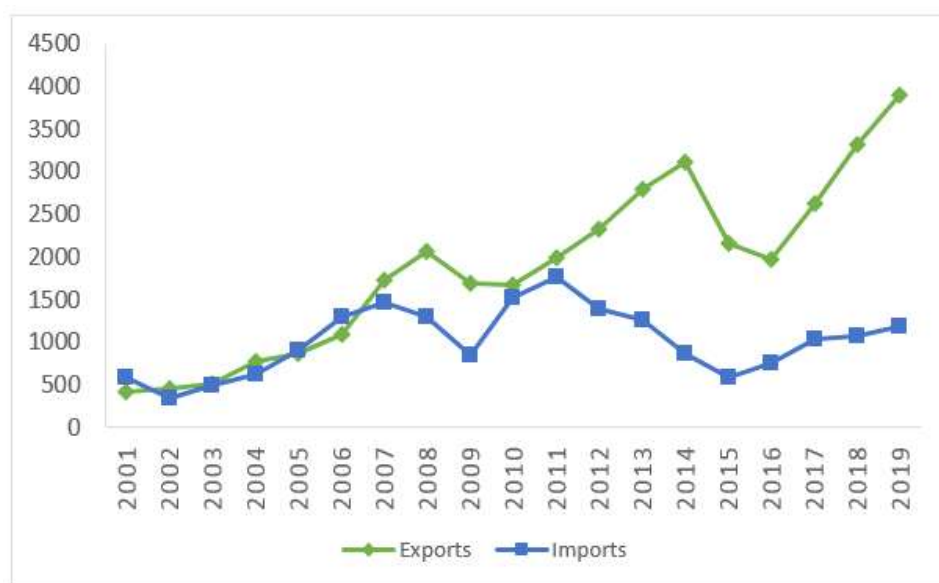
Source: The Author's compilation based on the ITC (2020) data

Russia's share of total Uzbekistan imports fell from 22 percent in 2017 to 18 percent in 2019. However, imports increased in nominal terms from 2.6 billion US dollar to 3.9 billion US dollar during the same period. Uzbekistan's share of total Russian exports was insignificant, ranging from 0.7 percent to 0.9 percent. At the same time, data from Russian sources show that the country's share of Uzbekistan's total exports fell from 10.2 percent to 8.2 percent during the reporting period. However, calculations based on data from Uzbekistan show that the indicator ranges from 14.4

percent to 15%.

Due to most of its citizens living in rural areas, Uzbekistan's economy is mostly dependent on agricultural commerce and production. As a result, the country has a high rate of employment in agriculture, which influences its trade patterns. As a result, agricultural and food goods make up most Uzbekistan's exports to Russia. Calculations of agricultural product trade show significant trends in the growth of the sector in both nations. For instance, Russia bought 154.3 million US dollar worth of agricultural and food products from Uzbekistan in 2001, making up 26.4 percent of all imports. The imports in 2019 totaled 228.2 million US dollar, with a corresponding share of 19.4%. Russia also developed become a significant exporter of food and agricultural goods to Uzbekistan. While its exports in 2001 totaled 34.2 million US dollar, far less than Uzbekistan's indicator, Russia supplied agricultural and food products worth 462.3 million US dollar in 2019. As a result, Russia's role shifted from net importer to net exporter of agricultural products. It should be noted that Russia's share of total exports to Uzbekistan increased from 8.4 percent in 2001 to 11.8 percent in 2019. While Russia imports primarily fruits and vegetables from Uzbekistan, its exports are more diverse, including milling industry products, sugar and sugar confectionary, sunflower-seed, safflower, or cotton-seed oil, buttermilk, cheese, margarine, chocolate, and many others.

Even though Uzbekistan's proportion of overall exports to Russia dropped from 45.7 percent in 2001 to 21.1 percent in 2019, cotton remains a significant export for the country. Over the past two decades of bilateral commerce, exports of motor vehicles have seen substantial modifications.

In 2001, Russia purchased 63 million US dollar worth of automobiles, accounting for 10.8% of all exports. Since the early 2000s, exports have increased dramatically, hitting a peak in 2007 of 633.8 million US dollar with a matching proportion of 43.4 percent. Exports of motor vehicles were negatively impacted by local and global economic crises, but the numbers remained strong. Exports of motor vehicles decreased following the establishment of the Eurasian Economic Union and subsequent modifications in its members' trade policies. In 2015, it dropped to 33.5 million US dollar. 2019 had a low of 18.7 million US dollar in exports, and its proportion fell to 1.6 percent.

Along with growing agricultural and food production, Russia also increased its exports of other goods. Expenditures of mineral fuels, for instance, rose from roughly 3 million US dollar in 2001 to 241.5 million US dollar in 2019. The equivalent shares of mineral fuels increased from 0.7 percent to 6.2 percent throughout the reporting period. The supply of wood goods has also expanded significantly. Exports in 2019 totaled 437.8 million US dollar, compared to 12.5 million US dollar in 2001. The percentage of wood goods rose from 3 to 11.2 percent. Supplies of machinery and mechanical appliances increased from 60.4 million US dollar to 418.1 million US dollar during the same time period. But the percentage of machinery in all exports fell from 14.8% to 10.7%. 2019 had a low of US dollar 18.7 million in exports, and its proportion fell to 1.6 percent. Finally, there have been improvements in the exports of vehicles, primarily autos. While supplies totaled 18.8 million US dollar in 2001 and the corresponding proportion was 4.6 percent, they rose to 246.6 million US dollar and 6.3 percent in 2019 correspondingly.

As a result, as the calculations show, Russian firms are strengthening their positions in Uzbekistan. Russia transitioned from a net importer of agricultural products to a net exporter, increasing manufacturing exports to Uzbekistan. Competition with Russia necessitates support not only for exporting industries, but also for the most impacted businesses. Uzbek authorities should consider these facts when developing future trade policies and considering their approach to regionalism.

2.7 Trade volume between Uzbekistan and Central Asia

2019 had a low of 18.7 millioncUS dollar in exports, and its proportion fell to 1.6 percent.

The shift in foreign policy's focus to forging positive ties first and foremost with the nation's Central Asian neighbors has been one of the most noticeable expressions of reforms in this area. People from border regions were able to contact freely thanks to the dramatic simplification of border crossing processes, which also occasionally enhanced the amount of transportation communication with Central Asian nations. Bus service was reinstated.

Additionally, the rapid expansion of favorable economic and trade connections was emphasized. The circulation of commodities across the border has become freed, and trade formalities have been greatly simplified. Mutual investments are now possible. All of this allowed the amount of trade between Uzbekistan and the nations in our region to increase. This essay will concentrate on how trade cooperation between Uzbekistan and the Central Asian nations has grown and what qualitative

changes have taken place in the trade relationship between Uzbekistan and them.

Uzbekistan's commerce with Central Asian nations climbed 2.6 times during five years, from 2.5 billion US dollar in 2016 to 6.3 billion US dollar in 2021. Exports to Central Asian nations climbed by two times, from 1.3 billion US dollar to 2.7 billion US dollar, while imports increased by three times, from 1.2 billion US dollar to 3.7 billion US dollar.

The entire volume of Uzbekistan's foreign trade with the rest of the world expanded by 1.7 times during the review period, with exports growing by 1.4 times and imports by 2 times, but trade with Central Asian nations grew more quickly. The percentage of Central Asian nations in Uzbekistan's overall foreign trade turnover climbed from 10.2 to 15.1 percent, from 10.8 to 16 percent in exports, and from 9.6 to 14.5 percent in imports. In terms of commerce with each of the Central Asian nations independently, 2021 has also become a record year. The amount of trade with all Central Asian nations has increased over the past five years: with Kazakhstan, by a factor of two, up to 3.9 billion US dollar, with Kyrgyzstan, by a factor of 5.7, up to 952 million US dollar, with Tajikistan, by a factor of three, up to 605 million US dollar, and with Turkmenistan, by a factor of four, up to 882 million US dollar.

Trade structure varies each country.

By the end of 2021, Kazakhstan will still be Uzbekistan's top commercial partner in Central Asia, although over the reviewed period, there was a tendency toward a decline in its share. In 2021, Kazakhstan's proportion

in Uzbekistan's trade with Central Asian nations will fall to 62 percent from 77 percent in 2016. The volume of trade with other nations has grown at the same period. Tajikistan's part climbed from 8% to 9.5%, Turkmenistan's share from 8.5% to 14%, and Kyrgyzstan's portion increased from 7% in 2016 to 15% in 2021, respectively.

Uzbekistan has fundamentally considerably diversified its exports within the Central Asian region at the same time. If more than 70% of Uzbekistan's exports to Central Asian nations in 2016 were transported to Kazakhstan, then by the end of 2021, 44% had already been sent there. The percentage of exports to Kyrgyzstan also dramatically grew throughout this period, rising from 9.3 percent in 2016 to 30 percent in 2021. As a result, during the period under review, Turkmenistan's export portion climbed from 6.1 percent to 7.2 percent, and Tajikistan's part increased from 12.6 percent to 19 percent.

Such volatility is not indicative of structural changes in imports by country. Kyrgyzstan and Tajikistan's shares in the total volume of imports to Central Asian nations remained essentially steady at 4 percent and 2.8 percent, respectively, while Kazakhstan's portion fell from 82 percent in 2016 to 74 percent in 2021. Turkmenistan now accounts for 19% of all imports, up from 11% previously.

Commodity shifts in trading structure

As was already said, Central Asian nations now account for 15% of Uzbekistan's overall international commerce, up from 8% in the past several years. Due to its two-fold distance from the ocean and its limited access to all the benefits of maritime trade, Uzbekistan aims to fully utilize the trade potential of its neighbors.

Food (30.8 percent), mineral items (29.8 percent, mostly fuel and energy products), and chemical products made up many Uzbekistan's commodity exports to Central Asian n

The volume of exports of fruits and nuts fell by approximately 25% from the level of 2017 and by more than twice that amount from the level of 2019, which led to a reduction in the share of food in commodity exports to 20%. Due mostly to a decline in natural gas exports, the percentage of mineral products in exports declined to 6.4 percent.

The volume of exports of fruits and nuts fell by approximately 25% from the level of 2017 and by more than twice that amount from the level of 2019, which led to a reduction in the share of food in commodity exports to 20%. Due mostly to a decline in natural gas exports, the percentage of mineral products in exports declined to 6.4 percent.

Chemical items made up 13.7 percent of Uzbekistan's exports to Central Asian nations in 2021, remaining at the same level. Fertilizers, which made up 5.9 percent of this group's exports, and polymers, whose share of exports marginally dropped from 5.6 percent in 2018 to 4.9 percent in 2021.

The volume of textile and apparel exports to Central Asian nations climbed by 4.4 times in 2021, reaching 490 million US dollar. The export of apparel increased five times from 50 million US dollar in 2017 to 250 million US dollar in 2021, which was mostly responsible for the growth. It is also important to mention that during the study period, exports of silk products to Central Asian nations rose from 111 000 to 22 million dollars. Additionally, home textile exports climbed by 9 times, while knitted fabric exports increased by 16 times.

Additionally, the largest market for Uzbek shoes is in the nations of Central Asia. From 10 to 35 million dollars, the export of footwear products increased 3.5 times between 2017 and 2021.

Uzbekistan actively increased its exports of automobiles to the Central Asian market throughout the years under consideration. For example, the number of automobiles exported climbed by 8.7 times, from 30 US dollar to 264 million US dollar, and the proportion of Uzbekistan's overall exports to Central Asian nations increased from 1.2 percent in 2018 to 15 percent in 2021.

The following trends can also be seen if we look at how export structures have changed since we started classifying commodities using the Standard International Trade Classification (SITC 2008):

- a decrease in the percentage of fuel and energy goods from 36 percent in 2018 to 3.4 percent in 2021.

- an increase in the percentage of industrial goods from 10 percent to 24.4 percent in 2021.

- a rise in the percentage of finished products from 6 percent in 2017 to 16 percent in 2020-2021.

- and a range of 1-6 percent for the percentage of raw materials in exports, including chemical products.

As a result, Uzbekistan has greatly diversified its exports to Central Asian nations in recent years, mostly by exporting more high-quality goods.

the import structure has changed. Historically, Uzbekistan has mostly imported from Central Asian nations food, mineral resources (primarily fuel and energy), and metallurgical goods.

The expansion of imports of mineral products, whose share climbed from

31.5 percent in 2017 to 41 percent in 2021, is primarily responsible for the main structural changes in imports. At the same period, the percentage of metallurgical product imports dropped from 29% to 17%.

To ensure Uzbekistan's food security, it is important to consider some recent trends regarding structural changes in consumption in the economy and the strengthening of Central Asian countries' roles in this regard.

Considering the increase in population consumption between 2017 and 2021, Uzbekistan significantly increased its imports of livestock, meat, grains, and flour from Central Asian nations, from 40,000 in 2017 to 94 million dollars in 2019 and 85 million dollars in 2021, accounting for 14 − 20 percent of Uzbekistan's overall imports from the region. Sunflower oil imports grew by 11 times. Currently, a third of Uzbekistan's total food imports come from Central Asian nations.

During the time under study, the percentage of imported gasoline and energy goods rose from 20 to 27 percent. Additionally, Central Asia's share of Uzbekistan's overall imports of commodities related to energy climbed from 32% in 2017 to 64% in 2021.

Ferrous metals are mostly imported for use in metallurgy, but over the study period, their proportion in the total volume of imports from Central Asian nations fell from 23% to 14%. Most of the goods imported by Uzbekistan are semi-finished goods, flat-rolled goods, and iron and non-alloy steel bars.

In addition, the amount of cement imported from Central Asian nations has increased recently by 5.8 times, while the volume of copper ores and concentrates has climbed by 17.6 times.

Chapter 3 Literature review

3.1 Literature review of bilateral trade

Bilateral trade is undoubtedly the exchange of goods and labor between two countries in order to advance trade and investment. The basic objective of bilateral trade is to improve market access and economic growth between two nations. As opposed to multilateral trade agreements, bilateral trade agreements are simpler to negotiate. Parties can also benefit from trade sooner than through multilateral trade.Trade blocs are essentially vulnerable to multilateralism and regionalism in the global trading system. One of the most significant changes in global economy in recent years has been the expansion of the regional trading bloc. Although the regional trading blocs' organizational structures considerably differ, they typically share the goal of restricting trade between their members by enacting tariff systems (Ghani et al. 2008). Bilateral trade flows through the free trade zone in the regional trading bloc are influenced by factors including income, population, and distance, as well as the success of trade agreements signed by regional members like ASEAN.

Tariff barriers, institutional barriers, and non-tariff obstacles are the three categories into which Gonzales, Bailes, and Amano (1991) separated international trade hurdles. Non-tariff barriers (NTBs) are frequently employed in addition to tariffs to regulate imports. Hillman (1991) asserts that all NTBs have restrictions, with the exception of traditional customs

charges, which distort global trade. Typical non-tariff measures include pricing controls, health and safety regulations, licenses, quotas, and restrictions for quantity control (United Nations, 2008). Regulational, cultural, and industry barriers are also examples of non-tariff barriers. Barriers have been divided between natural and artificial barriers in several research. Natural barriers are not self-created, whereas artificial obstacles are (Balassa, 1965 & 1982; Basevi, 1966; Corden, 1966 & 1971).

Researchers frequently examine the bilateral trade flows of nations. While some scholars focused primarily on the population, others thought that distance had a considerable impact on bilateral trade flows. For instance, Sohn, Chan-Hyun, a Senior Fellow at the Korea Institute for International Economic Policy, used the Gravity Model to do research on Korea's trade. His study, "The Relapse After-Effects of the Examination," found that between-industry exchanges, as clarified by the Heckscher-Ohlin model, are typical in Korea's global exchange and that Korea's reciprocal exchange designs suit the basic gravity model well.

As a result, in order to expand respective exchange volumes, it appears to be more appealing for Korea to advance reciprocal exchange with nations that are close by and have large economies. Nonetheless, Korea's real exchange volumes with nations such as Japan and China, which offer more significant benefits in terms of financial size and distance, appear to fall short of the exchange volumes predicted by the gravity model. This implies that there are significant trade barriers between Korea and these countries. As a result, by advancing a more comprehensive type of exchange progression with both Japan and China.

Korea is expected to fully exploit its exchange opportunities and augment exchange gains. Furthermore, the distance variable was used as a statistically significant variable with the expected negative sign. It demonstrates that geographical distance is an important factor in bilateral trade flows. The coefficients of the log of the distances estimated by previous studies are shown in the table below.

Table 14. FDI inflows in Uzbekistan in 1991-2016 (billions USD)

Year	Researcher's name	Coefficient
1966	Linneman	−0.76
1998	Frankel	−0.732
1999	Wall	−0.953
1999	Garman	−0.942
2001	Sohn,Chan-Hyun	−0.924
2018	Yan Peiheng	−0.62
2018	Mohd Fairuz Md. Salleh, Wan Sallha Yusoff, Norida Basnan, Tengku Suriani Tengku Yaacob	−0.564

The total market value of all finished goods and services produced in a country over a given time is known as the gross domestic product (GDP). GDP is typically calculated on an annual basis. The GDP of a country is calculated by factoring in all private and public consumption, government expenditures, investments, private inventories, construction costs, and the foreign balance of trade. Following are some economic theory-based explanations for GDP:

o GDP is the monetary and total market value of all goods and services produced in a country during a specific time.

o Gross domestic product provides a country's economic scale; it is commonly used to estimate an economy's level and growth rate.

o Gross domestic product is typically calculated using expenditures, production, and income.

o GDP is an important tool for policymakers, investors, and businesses in making strategic decisions.

GDP is widely used as a primary tool in analyzing bilateral trade, particularly when using the gravity model method. The gravity model is primarily concerned with the economic scale of both parties. GDP or GNP can explain a country's economic scale. High GDP levels, according to the gravity model, may increase bilateral trade flows.

The term population refers to a group of people or living beings. A population is a group of people who are studied in statistics. Population is also an important tool in economic research. Because population size is directly related to demand for something. The effect of population on trade flows may vary. Population growth may have a positive impact because it brings with it a higher level of specialists and technology. As a result, more products are available for export. However, some other researchers believe that as the population grows, income per capita decreases, making everyone poorer. The low level of per capita income may reduce demand for export and import. Karimi Hosneijeh (2008), for example, investigated negative population coefficients for both parties.

It means that as the population grows, trade declines because more people require more products for domestic use. However, this paper anticipates that increased population size will have a positive effect on bilateral trade flows. Because the greater the population, the greater the demand for trade.

One of the most important aspects of trade is logistics. Better logistics

performance has been linked to increased international trade, the ability to attract foreign direct investments, and the country's economic development. There were some empirical studies that looked at the impact of logistics systems on trade flows. Logistics competence was investigated by Levchenko (2004) and Francois and Manchin (2007). They investigated the quality of services provided by the private sector in this study. They also investigated the effects of cargo storage services, transportation agencies, information technologies, and packing services on trade flows. Levchenko (2004) discovered the significance of differences between countries. Other researchers focused on the logistic performance index (LPI) as an important aspect of international trade.

The Customs Index measures the level of service provided by customs. As we all know, customs clearance procedures are linked with export import agencies and other border services. According to the World Bank, the customs index is calculated based on how customs declarations are processed electronically and clearly, how export and import occur according to schedule, whether information is complete and available on time, and whether or not customs clearance documentation is expensive. All of these factors influence the LPI customs index. According to Cipolla (2013), the impact of customs variables on international trade flows is particularly significant.

The quality of transportation infrastructure and information and communication technology is measured by the infrastructure index. A high level of infrastructure may have a positive impact on communication among all parties in a supply chain. The international shipment index represents the management of deliveries as well as the competitive cost of

goods. Companies may benefit from low transportation costs and high service quality. Low transportation costs may have a positive impact on international trade.

In international trade, the logistic quality and competence index is especially important. Customs brokers are in charge of providing high-quality logistical services. They collaborate to meet the needs of the customer. According to the World Bank (2007), when the private sector is well developed, logistics quality will improve.

A trading system's timeliness is also important. Timeliness is a key indicator of logistical performance. Timeliness index determined in logistic performance based on delivery delays, lack of shipment, and use of communication technology factors.

The tracking and tracing index measures the effectiveness of logistics information and communication technology systems. The high performance of tracking and tracing indexes is primarily due to advancements in information and communication technologies.

According to the World Bank, the LPI global ranking began in Germany in 2018. Germany's total LPI score was 4.20. In 2018, Uzbekistan ranked 99th on the LPI.

According to Table 11, Uzbekistan's logistic system ranks in the middle of the world. In comparison to other Asian countries, clearing customs in Uzbekistan takes longer. For exports, the shipping cost in Uzbekistan is approximately 30-60% of the cargo value. This index is also higher in comparison to other countries. These and other types of issues must be addressed. Because high logistic costs and poor logistics service quality can have a negative impact on international trade.

3.2 Theoretical foundation of gravity model.

Global exchange hypotheses are essentially various speculations to explain global exchange. The concept of exchange refers to the exchange of labor and products between two people or things. The concept of global exchange then refers to the trade of individuals or substances between two distinct nations. Individuals or elements exchange because they recognize that they will profit from the transaction. They may require or require the products or services While this may appear simple on the surface, there is a lot of hypothesis, strategy, and business methodology that goes into establishing global exchange.

Adam Smith depicts exchange as occurring as a result of nations enjoying outright advantage in the production of specific products in comparison to one another. In Adam Smith's framework, supreme benefit refers to the situation in which one country can produce a unit of a decent with less work than another country. International trade was critical to the global economy's rise. Prices are both influenced by and influenced by global events in the global economy. Developed countries can use their resources with the help of international trade. For example, more efficient use of labor, technology, or capital. Different countries have various assets and natural resources, such as technology, labor, capital, and so on. This enables some countries to produce the same goods more efficiently, that is, faster and at a lower cost. As a result, they may be able to sell it more efficiently than other countries. If a country is unable to produce a good, it can obtain it by exchanging goods with another country that can. In international trade, this is known as specialization.

According to the global exchange hypothesis, regardless of whether one country has an outright advantage over another, it can profit from specialization. The sentences below can help you understand international trade theory more easily:

- International trade is the exchange of goods and services between nations. - Trading internationally allows buyers and countries to be exposed to labor and products that are not available in their home countries or are more expensive.

- Political economists such as Adam Smith and David Ricardo recognized the significance of global trade from the start.

- Still, some argue that global exchange can be disastrous for smaller countries, putting them in a difficult position on the global stage.

The global exchange gravity model Worldwide financial aspects is a model that predicts reciprocal exchange streams based on the monetary sizes and distance between two units. Examination reveals "overwhelming proof that exchange will generally fall with distance." Walter Isard first introduced the model to the financial world in 1954. The basic model for international trade between two nations is as follows:

F_{ij} = G

In this model G is explained as a constant, F expresses trade flows, D is the distance and M describes economic measurement of the countries. Using logarithms, the condition can be converted into a direct structure for econometric investigations. Financial analysts have used the model to investigate the determinants of reciprocal exchange streams such as basic

lines, basic dialects, standard general sets of laws, basic monetary forms, and regular pilgrim inheritances, and it has been used to test the viability of economic alliances and organizations such as the North American Free Trade Agreement (NAFTA) and the World Trade Organization (WTO) (Head and Mayer 2014).

In recent years, the gravity model has been widely used as a main model in foreign trade research. Deardorff described the trade gravity model as "a fact of life" (1998). The gravity model in trade, as we know, is related to Newton's Law of Universal Gravitation. His recipe expresses that the gravitational attraction between two objects is directly proportional to their masses and, conversely, proportional to the square of their distance. Furthermore, numerous experts blessed with the hypothetical legitimacy by assessing the model with various arrangements of factors and conditions6. Tinbergen (1962), for example, is well-known for his use of gravity models. He was the first economist to propose the gravity model for analyzing international trade flows. In his method, he mentioned that trade between two countries is related to the economic degree of the countries and the geographical distance between them. Tinbergen's "gravity" formula is as follows:

Tinbergen's "gravity" formula is expressed as:

$$F_{ij} = \frac{GDP_i^{\frac{\alpha}{}}}{D_{i,j}^{\frac{\alpha}{}}} \times \frac{GDP_j^{\frac{\alpha}{}}}{GDP_i^{\frac{\alpha}{}}}$$

Fij is trade between one country and partner countries, it may explain total trade volume or export and import; Mi and Mj are the economical scale of the two countries, this is usually explained by GDP or GNP, Dij shows the geographical distance between two countries. Linnemann (1966) introduced a fractional balance model of fare and import and added an extra factor to the model to mirror the exchange stream arrangement, a common use of the gravity model at the time. Bergstrand (1989) demonstrated the trade gravity model as follows:

$$M_{ij}=a_0 Y_i^{a1} Y_j^{a2} D_{ij}^{a3} A_{ij}^{a4}$$

Mij is the total import of country I from country j during a given time period; Yi is the GDP of the importing country; Yj is the GDP of the exporting country; Dij is the distance between the two countries; and Aij is any other factor that promotes or hinders trade flow between the two countries. Other factors include membership in the same regional organization, shared borders, speaking the same language, and practicing the same religion. These factors may also have an impact on bilateral trade flows.

Anderson (1979), the first specialist to discover the hypothetical foundation for the exchange gravity model, believes that the simples' gravity model is actually a rebuilding of Cobb-Douglas' use framework.

His trade gravity model was as follows:

$$M_{ij} = Y_iY_j/Y_w ,$$

Where M_{ij} is the import of goods of country i from country j; Y_i is the total imports of goods from the world; Y_j is GDP of country j; Y_w is the GDP of the world. The impedance variable, such as distance, was not considered by the use model. As a result, Anderson's consumption model does not complete the exchange gravity model's hypothetical establishment work.

3.3 Specification and estimation of the gravity model

When analyzing bilateral trade, the gravity model has several advantages. The estimates provide the result in a static framework; however, the reach of intraregional exchange may increase if the assessment is completed in a unique structure, incorporating the effects of components such as terms of exchange, scale economies, innovation spill-over, speculation inflows, and exchange progression. These could help with the creation of a short-term exchange while ignoring the genuine impact that has been running for a long time. According to some researchers, short-term impact is more important than dynamic impact.

According to Matyas (1997), using three types of speciation, time, exporter and importer characteristics, can show bilateral trade flows. Total export volume or bilateral trade volume, which is primarily expressed in currency, was primarily used as a dependent variable in the gravity model method when analyzing bilateral trade flows. As independent variables in this model, various variables such as GDP, income per capita, population, distance between the two parties, tariffs, and transportation costs have been commonly used. Other variables such as income level, land area, and GDP per capita can be used to estimate a country's market size and economic development level. Dummy variables, such as common culture, language, border, and FTA, are also used as positive factors in bilateral trade. The table below provides practical information about some empirical studies conducted by researchers using the gravity model:

Table 15. Previous studies on international trade modeling according to the gravity model

Year	Author	Objective	Dependent variables	Independent variables	Estimation method
2003	Mohammad Mafizur Rahman	Analysis of Bangladesh's Trade	Bilateral trade flows	GNP, GNP per capita, Tax, distance, Trade – GDP ratio, common border, common member of SAARS	OLS

2005	Chan-Hyun Sohn	Analyzing th Korea's bilateral trade	Bilateral trade flows	Product of GDPs, product of GDPs per capita, distance,	OLS
2007	Swapan K. Bhattacharya and Biswa N. Bhattacharyay	Analysis of bilateral trade between India-China	Bilateral trade flows	GNP, GNP per capita, distance, tariff rate,	-
2018	Piratdin Allayorov, Bahtiyar Mehmed, Sazzadul Arefin, Norbek Nurmatov	Analysis of Kyrgyzstan's Bilateral trade	Bilateral trade flows	GDP, population, distance	-
2018	Muhammad Saqib Irshad, Qi Xin, Zhang Hui & Hamza Arshad	Analysis of Pakistan's trade potential with China	Total trade of Pakistan with FTA partners	Products od GDPs, Trade cost, Inflation, openness of Pakistan, Openness of partners, religion, language, common border, WTO, membership, trade agreements	

3.4 Previous studies on bilateral trade using a gravity model method

In recent years, there has been an increase in interest in studying the international trade flows of Central Asian countries. Economic development in Central Asia has resulted in significant achievements due to political stability and advancement. From 1997 to 2016, the GDP of Central Asian countries increased by 9.9 percent per year, from 43 billion US dollars to 254, 2 billion US dollars. With a total area of more than 4 million square kilometers, the eight Central Asian countries are located in the heart of the Eurasian continent. The ancient Silk Road has also been the driving force behind China's trade relations with the five Central Asian countries of Uzbekistan, Kazakhstan, Turkmenistan, Tajikistan, and Kyrgyzstan. China's reconstruction of the "New Silk Road Belt" has a significant impact on China's trade relations with Central Asian countries, particularly Uzbekistan.

In terms of influencing components and capability of bilateral trade between China and Central Asia, Wei and Xu (2017) agree that the impact of China's financial advancement on respective exchange is greater than that of Central Asia. Increasing China's financial development can more effectively increase reciprocal exchange volume; geographical distance and taxes are impediments to respective bilateral trade flows, but their negative impact is diminishing with the advancement of innovation; the higher the level of transparency, the more prominent the bilateral trade flows;

However, the low degree of modern design similarity between China and Central Asia is not conducive to bilateral trade volume. Huang (2015) considered the exchange capability of China (Xinjiang) and five Central Asian countries on major farming items by incorporating GDP, GDP per capita, population total, distance, and agricultural output value added. Furthermore, Gao (2015) first used tariff variables to assess Central Asia and China's trade potential. Zhang (2016) used the Foreign Direct Investment and trade dependence variables to explain Central Asia's and China's reciprocal exchange capability. The researchers used a gravity model to analyze the influencing factors and trade potentials between Central Asian countries and China. We can easily see that different researchers used different methods and explanatory variables in their research. Despite the fact that some used the same variables in their gravity model, the regression results varied. The variables and previous studies are shown in the table below. These studies serve as important references for developing the gravity model method used in this paper. Using the gravity model method, some researchers examined the trade creation and trade diversion effects of Asian regional trade agreements in 2010. The paper was titled "Trade Blocs and the Gravity Model: Economic Integration Among Asian Developing Countries." The impact of language and culture on trade was significant, according to the results of this paper.

Table 16. The previous studies of trade relation between China and Uzbekistan using a gravity model

Year	Author	Objective	Dependent variable	Independent variables	Estimation method
2010		Analyzing the trade creation and trade diversion effects of the regional trade agreements in Asia	Trade flows	GDP, population, distance, border, language, colony	OLS
2015	Gao and Liu	Estimation and Prospect of Trade Potential between China and Central Asia	Export and Bilateral trade flow	GDP, population, distance, tariff rate, SCO dummy, WTO dummy, common border dummy	OLS
2017	Wei and Xu	Analysis of the influencing factors of trade between China and Central Asia	Bilateral trade flow	Multiplied GDP, distance, openness, population, industrial structure similarity, exchange rate, tariffs, common border dummy, SCO dummy, "OBOR"	

Chapter 4. Methodology and Results

4.1 Model specification and data explanation

In order to measure the flows of international trade, Yamarik and Ghosh (2004) and Tinbergen (1962) employed the other trade gravity model. The gravity model is initially described as follows:

$$Tij = A\frac{(GDPiGDPj)^{b1}}{(Dij)^{b2}}$$

Equation (1)

Where:

Tij is the variable of bilateral trade between country i and country j.
GDPi is a country 's national income.
GDPj is a country 's national income.
Dij is the geographical distance between the countries.

A is a constant of proportionality.

Using the logarithm, we obtain this:
Log   (Tij)=log(A)   +b1log   (GDPi*GDPj)−b2log   (Dij);

Equation (2)

Then adding stochastic component, we obtain this equation:

Log (Tij)=log(A) +b1log (GDPi*GDPj)−b2log (Dij)+ uij; Equation (3)

Within this we can test the impact of other variables on the bilateral trade flows. Taking the logarithms of gravity model Equation (3) and based on other scholar's related research, combined with the purpose of this research paper's study, this equation is used as a gravity model in this paper (Equation 4). The logarithmic form will be used for estimation and interpretation in this paper.

Log (Tij) = $\beta 0$ + $\beta 1$ Log (Yi)+ $\beta 2$ Log(Yj)+ $\beta 3$ Log(POPi)+ $\beta 4$ Log(POPj) + $\beta 5$ Log(LPIj) + $\beta 6$Log(LPIj) + uij

Equation (4)

Where:

$\beta 0$ is a constant term.

From $\beta 1$ to $\beta 8$ are regression coefficients.

uij is the error term.

Tij is construction trade flows between Uzbekistan and partner countries.

Y_i refers to the gross domestic product (GDP) of Uzbekistan.

Y_j refers to the gross domestic product (GDP) of a partner country.

POP_i indicates the population of Uzbekistan.

POP_j indicates the population of partner countries.

EXR is the exchange rate of Uzbekistan. TT is Transportation Time from Uzbekistan to partners countries. CIS is CIS (commonwealth of Independent States) memberships D is the distance between Uzbekistan and partners. T_{ij} is the dependent variable; while Y_i, Y_j, POP_i POP_j, EXR, TT, CIS and D are independent.

Due to a high demand for goods and economies of scale, it is projected that a large average of GDP and knowledge assets (a proxy for an average economic size) will promote two-way bilateral trade, as in the majority of previous studies (Thanh & Ji 2014). Thus, it is anticipated that the Y_i and Y_j's coefficient will have a positive sign. The population of the nation has a favorable impact on bilateral commerce, according to other earlier publications. Positive results from the population variable were also anticipated in this article (POP_i).

Transporting and storing the goods are logistical procedures involved in international trade. Trade flows may be negatively impacted by high logistical costs and poor logistical services.Transportation time is dependent on several dimensions that are infrastructure, logistic quality, and competence, tracking and tracing and customs. According to the these, the contribution of TT is to analyze logistical aspects of international trade of meanwhile Uzbekistan has not good quality of infrastructure. Because better infrastructure has an opportunity to attract foreign direct investment and international trade ability. So, this research paper expects positive influence of transportation time variable.

Table 17. Variables of gravity model and related explanations

Variable	Interpretation	Expected sign	Value	Theoretical analysis	Data source
Tij	Trade flow between Uzbekistan and partner countries		Current US dollar	The increase of total trade volume indicates a bright	UN Comrade
Yi	GDP of Uzbekistan	+	Current Us dollar	The more economic development the more demand for the trade	World Bank
Yj	GDP of Partner countries	+	Current US dollar	The more economic development the more demand for the trade	World Bank

POPi	Population of Uzbekistan	+	Total (Million people)	More population gives more opportunity to trade	World Bank
EXR	Exchange rate of Uzbekistan	+	Current US dollar	Stable exchange rate will guarantee to save trade with partner countries	World Bank
TT	Transportation time of Uzbekistan with partners countries	+	In Hours	Better quality of Logistics system can decrease transportation time and gives a big opportunity to international trade	Google
CIS	CIS memberships	+	Ranked 1 or 0	Membership gives a big opportunity to do trade easily and safely with member countries	Google
D	Distance from capital of Uzbekistan to capital of partner country	−	Km	Short distance is low transportation cost	Google map

The dataset type of this research paper is "Panel" kind. And the time series includes 21 years from 2000 to 2021. Uzbekistan is the reporting country while China, Kazakhstan, Kyrgyzstan, South Korea, Japan, Germany, Turkey, Ukraine, Tajikistan, Belarus and Russia are used as a partner. This dataset includes 31 variables and 231 observation ranges. Regression is calculated using software R Studio 4.2.0 for multiple linear regressions.

4.2 Results

Table18 reports the descriptive analysis of the bilateral trade flows of Uzbekistan and its partner countries and its explanatory variables. Table 16 shows empirical results of the gravity model.

Table 18. Descriptive statistics of all used variables

	Observations	Mean	Median	Min	Max
Yi	231	4.538e+10	4.977e+10	1.211e+10	8.566e+10
Yj	231	4.538e+10	5.477e+11	9.910e+08	1.487e+13
POPi	231	28612333	28001000	24488000	33906000
EXR	231	2691.3	1523.0	236.6	10054.3
TT	231	52.86	65.00	7.00	117.00
CIS	231	0.5455	1.0000	0.0000	1.0000
D	231	3025.0	3027.3	633.7	6214.9
Tij	231	4.881e+09	5.414e+09	8.568e+08	9.920e+09

This research continues with estimating a panel data regression model to analyze wealth factors, which may contribute to the growth of bilateral trade flows of Uzbekistan and its partners.

Table 19. The empirical results of Pooled OLS model

Variable	Sandart deviation	T −value	P −value
Y_{it}	3.187e−01	13.500	〈 2e−16 ***
Y_{jt}	2.103e−06	2.121e−05	0.921
POP_{it}	−8.696e+02	−9.515	〈 2e−16 ***
POP_{jt}	−6.306e−02	−0.407	0.684
D_{ij}	1.488e+04	0.554	0.580
ERX	6.468e+05	10.974	〈 2e−16 ***
TT	−1.596e+05	−0.152	0.8796
CIS	−4.965e+07	−0.506	0.613
P−alue	〈 2.2e−16		
R^2	0.9831		
Adjusted R^2	0.9824		

According to the Pooled OLS model results, GDP of Uzbekistan, GDPof partners, distance and exchange significant Other other hand, when transportation time increases trade with partner countries decreases by 1.5 million US dollars.Unfortunately, the population of Uzbekistan, the population of partners, transportation time and CIS has a negative sign opposite than expected. R square is 0.9831 while adjusted R squared is 0.9824. OLS regression results show that if the GDP of partners rises by one million US dollars, bilateral trade between Uzbekistan and partners increases to 2.1 million US dollars. But if the population of partners increases to one million people, it will decrease bilateral trade to 6.3 million US dollars. When EXR increases, it will increase international trade by 6.4 million US dollars. Other other hand, when transportation

time increases trade with partner countries decreases by 1.5 million US dollars

However, there is a problem with the OLS findings. Panel data makes up the study's dataset. With a panel dataset, an OLS model regression is probably unsuccessful. We analyze both the fixed effects model (FEM) and the random effects model (REM) to address this issue. This research compared several models in order to obtain the most accurate statistical estimation of the model. The Hausman test was used to examine the relationship between explanatory variables and unobservable heterogeneity. The null hypothesis is not rejected because the probability result was greater than 0.05. As a result, the random effect model may be fitted. We continued using a random effect model in accordance with the Hausman test results. After checking fixed effect model. We compared fixed model with ols model and p value is 2.351e−05. Result is so small that means that we should choose fixed model.

The empirical results of fixed and random effects Models

In terms of statistical significance, results shows that the gravity models' overall performance for knowledge assets and global trade flows is satisfactory. At the level 1 percent to 5 percent, the constant terms Yj, POPj, and LPIi are all statistically significant. Yi, POPi, LPI, and Dij do not have any bearing. The equation's R−squared value of 0.97215 indicates that the model's overall performance is highly expressed.

According to this model's coefficient of determination (R2), independent variables may explain 97 percent of the dependent variables. The significance of this model shows that the gravity model provides a satisfactory account of bilateral commerce between partner nations and Uzbekistan.

Unfortunately, the regression's findings indicate that Uzbekistan's GDP, which has a positive sign of 1, is roughly in line with expectations. 3.18 is the estimated GDP coefficient for Uzbekistan. The GDP of the partners (Yj) is 2.10, according to the regression results, which implies that if the GDP of the partners rises by one million dollars, the bilateral trade flow between Uzbekistan and its trading partners will rise by 2.10 million dollars. The economic scales of partners and Uzbekistan are varied, and as a result, so is the impact of the economic scale on trade.

Although both countries' economies have continued to rise in recent years, Uzbekistan's growth rate has been reaching a pinnacle. A significant portion of Uzbekistan's GDP comes from foreign trade. This fact may be the cause of the beneficial effect Uzbekistan's GDP (Yi) has on the desire for trade with its partners. Contrary to expectations, there are 4 partners in the population who are statistically significant and have a negative sign. Bilateral trade volume will fall by 6.30 million US dollars if the projected coefficient of partners' total population rises by one million. Theoretical predictions state that a significant number of populations have access to commerce in a wide range of items.

Population size of Uzbekistan's partners is different from each other. As we know the population of China is excessively big while other countries do not have a huge population. Population of Kazakhstan is at the average level, but the population of Kyrgyzstan is lower than other partners.

The populations of Uzbekistan's partners vary from one another. As is well known, China has an overly large population compared to other nations. The population of Kazakhstan is typical, although Kyrgyzstan has a smaller population than its neighbors.

The impact of Uzbekistan's transportation delay on bilateral trade flows is negative, contrary to expectations, as indicated by the regression coefficients. A TT increase of one hour reduces the bilateral trade flows by $1.59 million USD. Transporting and storing the goods are logistical procedures involved in international trade. Low-quality logistical services and high logistical costs may have a detrimental impact on trade flows.Better logistic performance has an opportunity to attract foreign direct investment and international trade ability. Developing the logistic system gives more opportunity to do international trade with partners.

Chapter 5. Conclusion

After the independence of Uzbekistan trade relations with China, Russia, Kazakhstan, Kyrgyzstan and other partners have become increasingly close. For China and South Korea, Uzbekistan is both an important export market and energy supply base while Russia and Kazakhstan are main agricultural products resources for Uzbekistan. For Uzbekistan, China,South Korea, Germany and Japan has advanced technologies markets which are helpful to develop Uzbekistan's economy. Over the past twenty years, the trade volume between Uzbekistan, South Korea, China, Russia, Kazakhstan, Kyrgyzstan and other partners has gradually expanded. According to this background, this paper aimed to use the gravity model for analyzing and hindering effects of bilateral construction trade between Uzbekistan and its trade partners. And this paper provides some suggestions for both countries to plan their international trade in the future.

Due to the regression results of the gravity model, we can find that the GDP of partners of Uzbekistan, population of Uzbekistan, transportation time of Uzbekistan has a significant role in promoting bilateral trade volume. After 1995, both parties Uzbekistan and its neighbors entered a period of rapid development. The level of GDP directly determines supply and demand of both parties. The economic developed countries influence more than smaller countries. This idea had been in the studies of Gao and Zhang (2010). It is obviously explained by previous studies that population can positively impact bilateral trade. But this research paper

concluded that the population of partner countries has a negative effect on the bilateral trade flows between Uzbekistan and them. The Transportation Time has negative effects on bilateral trade volume. According to this paper's result, the degree of TT of Uzbekistan has a negative influence on the bilateral trade flows between Uzbekistan and chosen partners. Transporting and storing the goods are logistical procedures involved in international trade. It has already been determined that trade flows may be negatively impacted by excessive logistical costs and subpar logistical services. The level of international trade might change depending on all factors. Improved logistical performance may increase the ability to attract foreign direct investment and global trade. In order to swap its abundant natural resources for foreign investment with its neighbors, Uzbekistan should expand its level of international trade. More opportunities for international trade are provided by short distances and affordable transportation. The development of profitable bilateral trade relations with China, Kazakhstan, Kyrgyzstan, and Russia is mostly due to this advantage.So trade countries that chosen as a partner would be the bridge to reach the seaways using the railroads. In addition to this, EXR is positive effect in this paper but on the other hand CIS membership is negative effects to the international trade with Uzbekistan and trade partners.

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Appendices

Source of data for variables

Tijt: UN Comtrade (https://comtrade.un.org/data/)
Yi/Yj: World Bank (https://data.worldbank.org/)
Pop i/ Popj: World Bank (https://data.worldbank.org/)
EXR: World Bank (https://data.worldbank.org/)
Dij: Google Map
TT/CIS: Google

국 문 초 록

시공의 중력 모형. 우즈베키스탄의 경우

한 성 대 학 교 대 학 원
국 제 무 역 경 제 학 과
국 제 무 역 시 장 전 공
아 드 함 존

　　본 논문은 우즈베키스탄과 주요 교역국 간의 건설 무역을 분석하는 것을 목표로 한다. 또한 2000년부터 2020년까지 21년에 걸쳐 우즈베키스탄과 무역 파트너 간의 중력 모델 분석 교역이 이루어졌다. 회귀 분석 결과는 중력 모델의 기본 가정을 확증하고 우즈베키스탄의 GDP와 우즈베키스탄의 무역 상대국의 GDP가 건설 무역량에 긍정적인 영향을 미치도록 설계하였다. 파트너의 인구는 또한 국제 무역에 부정적인 영향을 미친다. 그리고 운송시간(TT)는 건설 무역 흐름의 개발을 촉진하는 데 주요한 역할을 한다. 게다가 우즈베키스탄의 TT는 건설 무역 흐름에 부정적인 영향을 끼친다. 우즈베키스탄의 무역 발전은 오랜 물류 체계와 교통 구조 등 많은 문제에 직면해 있다. 본 논문의 결과는 우즈베키스탄의 무역 정책 수립과 파트너와의 무역 개선을 위한 향후 계획을 제시한다. 높은 운송 비용과 낮은 품질의 물류 구조는 국제 무역에 부정적인 영향을 미칠 수 있다. 더 나은 교통 시스템은 외국인 직접 투자와 국제 무역 능력을 사로잡을 수 있는 더 많은 기회를 갖는다.

【Keyword】양국간 무역, 운송 시간, 환율, 중력 모델, 우즈베키스탄.